Residential Ethernet

5 Criteria

From 802.3 Operating Rules v5.5 July 2003
Note: “*” means further refinement is expected

Broad Market Potential

Broad set(s) of applications
Multiple vendors, multiple users
Balanced cost (LAN vs. attached stations)

- "Residential Ethernet" networks represent a new and very broad application space for Ethernet. The digital networking port* on consumer electronics (96 billion USD in 2003) equipment has not yet been decided, and 802.3/Ethernet has a strong possibility of being the dominant, long-term solution of choice if it also provides isochronous services.

- At the RE Study Group meetings, individuals from companies representing component suppliers, equipment vendors and users expressed their support for the project. Ethernet equipment vendors and customers are able to achieve an optimal cost balance between the network infrastructure components and the attached stations.

*NOTE: 174 million ports in 2004; 2008 - 458 million; growth rate 21%, 50/50 wireless/wireline (3rd. Party Research)

Compatibility with IEEE Std. 802.3

Conformance with CSMA/CD MAC, PLS
Conformance with 802.2
Conformance with 802.1D, 802.1Q, and 802.1F* (Not in Rules v 5.5)
Conformance with 802 Functional Requirements

- As an amendment to IEEE Std 802.3, the proposed project will remain in conformance with the 802 Overview and Architecture with the expected augmentation of the MAC service interface to support timing synchronization and isochronous traffic.
- As an amendment to IEEE Std 802.3, the proposed project will remain in conformance with 802.1D, 802.1Q and 802.1f, though extensions to these standards may be proposed as additional work items.
- As an amendment to IEEE Std 802.3 the proposed project may require minimal augmentation of existing MAC specifications and will use existing PHYS utilizing full-duplex mode.
- As an amendment to IEEE Std 802.3, the proposed project will follow the existing format and structure of 802.3 MIB definitions.

Distinct Identity

Substantially different from other 802 and 802.3 specifications / solutions
Unique solution for problem (not two alternatives / problem)
Easy for document reader to select relevant spec.

- There is no existing 802.3 standard or approved project that provides isochronous delivery with low-latency, low-jitter and guaranteed bandwidth.

- The proposed project will be formatted as an amendment to IEEE Std 802.3, making it easy for the document reader to select the RE specification from within 802.3.

Technical Feasibility

Demonstrated feasibility; reports – working models
Proven technology, reasonable testing
Confidence in reliability

- Ethernet systems (comprising interface controllers, bridges, routers, management systems, and other devices) represent the most widely deployed networking technology in history. The proposed project will build on the vast array of Ethernet component and system design experience, and the broad knowledge base of Ethernet network operation.
- The proposed project will, to the extent possible, re-use specifications developed by 802.3 and develop any new access control augmentations in accordance with the rigorous standards of proof applied to 802.3 projects. These augmentations will not involve significant added complexity. Time-sensitive services are already present in other common technologies, e.g. IEEE 1394.
- The reliability of Ethernet components and systems can be extrapolated in the target environments with a high degree of confidence.

Economic Feasibility

Cost factors known, reliable data
Reasonable cost for performance expected
Total installation costs considered

- The cost factors for Ethernet components and systems are well known. Ethernet consistently demonstrates the most attractive cost/performance ratio of any networking technology, at any operating speed. This fact is well established in the current networking application space.
- Adding Residential Ethernet services will have a negligible impact on the current cost of an Ethernet port.
- This project may improve on general cost/performance, due to the significantly higher volumes in the consumer electronics/residential application space.
- Installation costs, as well as maintenance and operations costs, should be reduced when compared to competing technologies through a combination of simpler, more reliable configurations and a more optimal system architecture.

Straw Poll

The RESG accepts the draft 5 Criteria (re_critters_012505.pdf).

Y: 21 N: 0 A: 3

5 Criteria Draft from November 2004

Broad Market Potential

Broad set(s) of applications
Multiple vendors, multiple users
Balanced cost (LAN vs. attached stations)

- Moves Ethernet into big new markets with the potential to eventually dominate
  - Consumer electronics companies will be producing Ethernet equipment
- Current home Ethernet ports are in the millions; new capabilities will increase this number
- CE products (100's million of potential ports)
  - DVD, TV, AVR, DVRs, speakers, etc.
  - Portable A/V products, musical instruments
- Attractive alternative/upgrade to current 1394-based and proprietary solutions
  - Make Ethernet become a "household" word

Compatibility with IEEE Std. 802.3

Conformance with CSMA/CD MAC, PLS
Conformance with 802.2
Conformance with 802

- Fully 802.3 compatible
  - Fully compliant with existing frame format
  - Fully compatible with 802.3 in best-effort MAC services
  - May require augmentation of MAC with time-sensitive MAC services
  - RE will have to augment the MAC-client interface to exchange time information
- Fully 802.1 compatible
  - Anticipated that it will be fully compatible for best-effort service with possible 802.1 work to add time-sensitive service.
- RE features may need to be auto-negotiated
  - Time-sensitive mode is a highest-common denominator
- Based on existing PHYs
- Supports PoE

Distinct Identity

Substantially different from other 802 and 802.3 specifications

One unique solution for problem

Easy for document reader to select relevant spec.

- No time-sensitive MAC services in 802.3
  - No provisioning in 802.3 yet
  - No latency max in 802.3 yet
  - RE may leverage parts of 802.3ah
- Expect to have a separate clause

Technical Feasibility

Demonstrated system feasibility
Proven technology, reasonable testing
Confidence in reliability

- Feasibility proven by existing 802.3 technologies
  - Existing PHYs
  - Add clock to MAC (already done for EPON)
- Mostly adding a set of rules for sending timesensitive in addition to best-effort frames on existing MAC
- Requires some coordination with 802.1 for provisioning extensibility
- Time-sensitive services are already present in other common technologies, e.g. IEEE 1394, SONET, T-1, etc.

Economic Feasibility

Cost factors known, reliable data
Reasonable cost for performance
Total installation costs considered

- Development investment is relatively low
- High product value due to increased capabilities
- Significantly reduces system cost
  - Removes many connectors, cables etc.
  - Reduces processing core (cheaper CPU, memory)
- Leverage CE volumes for silicon (adds 100's of millions of ports)
  - Enable significantly higher levels of integration and functionality
- Incremental cost to consumer will be negligible in near term (1st or 2nd generation product)
- CE manufacturers (silicon customers) want it ASAP